

REMARKS

Claims 1, 6-28 and 43-46 are pending. Claims 29-42 were previously withdrawn from consideration. Claims 1, 7, and 21 have been amended, and claims 2-4 have been cancelled by this Amendment.

Applicants note with appreciation the courtesy extended by the Examiner during the telephone interview on October 24, 2003. As indicated during the telephone interview and explained below, Applicants believe that at least the pending claims under consideration are allowable.

Claims 1-4, 6-10, 12-15, 21, and 22 were rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,451,387B1 to Wadman ("Wadman"). Claims 11, 16, and 23 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Wadman. Claims 17, 18, and 43-45 were rejected under Section 103(a) as being unpatentable over Wadman in view of U.S. Patent No. 6,100,463 to Ladd et al. ("Ladd"). Claims 19, 20, and 46 were rejected under Section 103(a) as being obvious over Wadman in view of U.S. Patent No. 4,151,008 to Kirkpatrick ("Kirkpatrick"). Claims 24-28 was rejected under Section 103(a) as being unpatentable over Wadman in view of U.S. Patent No. 6,300,256B1 to Kriegel et al. ("Kriegel"). To the extent that these rejections have not been rendered moot by claim cancellation, the rejections are respectfully traversed.

According to exemplary embodiments, a technique is provided for laser sintering of particles in a material into a conjoined structure and for enhancing adhesion of the material to a substrate without damaging the substrate. According to one embodiment, the material is completely sintered and adhesion is enhanced by heating a top of the material by the laser and heating a bottom of the material by the substrate. This allows a uniform thermal spread to occur throughout the material.

For example, claim 1 recites a sintering method comprising providing a material including individual particles on a substrate, completely sintering the individual particles within the material together on the substrate, and enhancing adhesion of the material to the substrate without damaging the substrate. Adhesion of the material on the substrate is controlled by

maintaining a similar temperature between the substrate and the material for enhancing adhesion. Although not considered necessary, claim 1 has been amended in an effort to expedite prosecution to recite features similar to those formerly recited in claim 4, namely that the step of completely sintering is achieved by heating the top of the material by the laser and heating the bottom of the material by the substrate in such a manner as to allow sintering to occur throughout the material. Claim 4 has, accordingly, been cancelled.

As claim 4 formerly depended from (and included all the features of) claims 2 and 3, these claims have also been cancelled. Claims 7 and 21, which formerly depended from claim 2, have been amended as appropriate to depend from claim 1. The Action relied on Wadman for showing all the features recited in former claims 1 and 4.

Wadman discloses a method of applying a ceramic layer to an under-layer. In Wadman, two different embodiments are disclosed. In one embodiment, mutual sintering of ceramic particles in a ceramic layer occurs by heating the ceramic material with a laser at a wavelength adjusted to the energy-absorption power of the ceramic particles. See col. 2, ll. 26-42 of Wadman. In another embodiment, sintering of a ceramic layer to an under-layer occurs by applying a laser set at a wavelength adjusted to the absorption power of the under-layer to the surface of the under-layer. See col. 2, l. 64 through col. 3, l. 4.

Wadman does not disclose or suggest completely sintering the individual particles within the material together on the substrate by heating the top of the material by the laser and heating the bottom of the material by the substrate in such a manner as to allow a thermal spread throughout the material as recited in amended claim 1. Rather, in Wadman, only the ceramic layer is heated for mutual sintering of the ceramic particles.

Applicants respectfully submit that Wadman fails to disclose all the features recited in amended claim 1, and claim 1 is therefore considered allowable over Wadman.

Claims 6-28 and 43-46 depend ultimately from claim 1 and are considered allowable for at least the same reasons. In addition, these claims recite further features not disclosed or suggested by any combination of the cited documents.

For example, claim 22 recites that the method further comprises forming a highly reflective mirror with the sintered top layer, reflecting and diverting energy from the laser, and preventing sintering from occurring throughout the material deposited on the substrate. The Action asserts that the “effects” recited in claim 22 are considered inherent in Wadman. However, the Action has not shown why the steps recited in claim 22 would be necessary in the process described in Wadman and thus has failed to establish inherency. It is well settled that inherency must be a necessary result and not merely a possible result. See, e.g., In re Oelrich, 666 F.2d 578. Applicants respectfully submit that the steps recited in claim 22 would not only be unnecessary for the process described in Wadman but would be impossible for a system as described in Wadman to perform.

Applicants respectfully request that if the position is maintained that the features recited in claim 22 are inherent in Wadman, an explanation be provided why the steps recited in claim 22 would be a necessary part of the process described in Wadman.

For the foregoing reasons, claims 1, 6-28 and 43-46 are considered allowable. A Notice to this effect is respectfully solicited. If any questions remain, the Examiner is invited to contact the undersigned attorney at the telephone number given below.

No additional fee is believed due. However, the Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment of any fees to Deposit Account No. 14-0629.

Respectfully submitted,

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Date

11/18/03